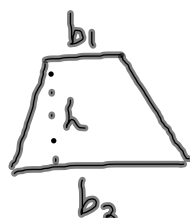
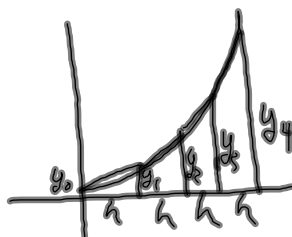


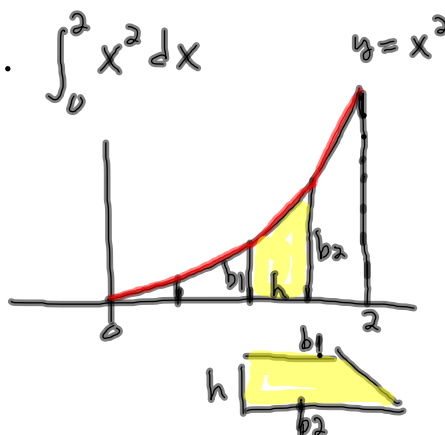
5.5 trapezoidal rule



$$\text{area} = \frac{1}{2}(b_1 + b_2)h$$



$$\text{approx. } \int_0^2 x^2 dx$$



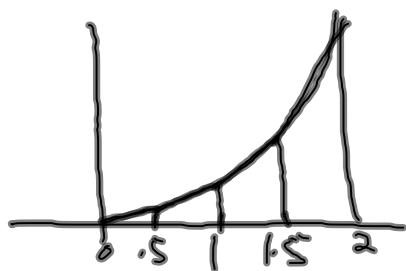
$$T = \frac{1}{2}(y_0 + y_1)h + \frac{1}{2}(y_1 + y_2)h + \frac{1}{2}(y_2 + y_3)h + \frac{1}{2}(y_3 + y_4)h$$

$$T = \frac{h}{2}[y_0 + y_1 + y_1 + y_2 + y_2 + y_3 + y_3 + y_4]$$

$$T = \frac{h}{2}[y_0 + 2y_1 + 2y_2 + 2y_3 + y_4]$$

Nov 30-12:51 PM

$$\text{approx } \int_0^2 x^2 dx \text{ with } T(4)$$



$$\frac{.5}{2} [0^2 + 2(.5)^2 + 2(1^2) + 2(1.5)^2 + 2^2]$$

$$h = \frac{2-0}{4} = .5$$

$$\text{exact: } \left. \frac{x^3}{3} \right|_0^2 = \frac{8}{3} = 2.667$$

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$$\int_1^2 \frac{\sin x}{x} dx = F(2) - F(1)$$

$$F(x) = \int \frac{\sin x}{x} dx$$

use trap(100)

$$F'(x) = \frac{\sin x}{x}$$

shortcut?

$$Lram = (y_0 + y_1 + y_2 + \dots + y_{n-1})h$$

$$Rram = (y_1 + y_2 + \dots + y_{n-1} + y_n)h$$

$$\frac{Lram + Rram}{2} = \left(y_0 + 2y_1 + 2y_2 + \dots + 2y_{n-1} + y_n \right) \frac{h}{2}$$

Trapezoidal rule

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Define $f(x) = \frac{\sin(x)}{x}$ Done

$$\frac{ram(1,2,100) + rram(1,2,100)}{2}$$

0.659329

2/99

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Ex 2 find ave Temp

Time ⁰~~N~~ 1 2 3

Temp 63 65 66 68

$$\frac{1}{b-a} \int_a^b f(x) dx$$

approx with trap

... 11 $M=12$

58 55

approx $\int_a^b f(x) dx$ with Trap

$$\text{ave Temp} = \frac{1}{12-0} \left[\frac{i}{2} (63 + 2 \cdot 65 + 2 \cdot 66 + \dots + 2 \cdot 58 + 55) \right]$$

$$= 65.167$$

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